1.0 INTRODUCTION

1.1 PURPOSE

This document provides technical and policy guidance for project managers and management teams making risk management decisions for contaminated sediment sites. It is primarily intended for federal and state project managers considering remedial response actions or non-time-critical removal actions under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), more commonly known as "Superfund." Technical aspects of the guidance are also intended to assist project managers addressing sediment contamination under the Resource Conservation and Recovery Act (RCRA). Many aspects of this guidance may also be useful to other governmental organizations and potentially responsible parties (PRPs) that are conducting a sediment cleanup under CERCLA, RCRA, or other environmental statutes, such as the Clean Water Act (CWA) or the Water Resource Development Act (WRDA). This guidance may also be useful to members of the community and their technical representatives.

This guidance also provides information to the public and to the regulated community on how EPA intends to exercise its discretion in implementing its regulations at contaminated sediment sites. It is important to understand, however, that this document does not substitute for statutes EPA administers nor their implementing regulations, nor is it a regulation itself. Thus, this document does not impose legally binding requirements on EPA, states, or the regulated community, and may not apply to a particular situation based upon the specific circumstances. Rather, the document suggests approaches that may be used at particular sites as appropriate, given site-specific circumstances. EPA made many changes to this document based on public comment and external peer review of draft documents. Even though the document is now final, however, EPA welcomes public comments on the document at any time and will consider those comments in any future revisions to the document which EPA may make without public notice.

Guidance presented in this document can be applied to contaminated sediment in a wide variety of aquatic environments, including rivers, streams, wetlands, ponds, lakes, reservoirs, harbors, estuaries, bays, intertidal zones, and coastal ocean areas. Sediment in wastewater lagoons, detention/sedimentation ponds, on-site storage/containment facilities, or roadside ditches is not addressed. This guidance addresses both in-situ and ex-situ remedies for sediment, including monitored natural recovery (MNR), in-situ capping, and dredging and excavation. However, because the science and practice of sediment remediation are rapidly evolving, project managers are encouraged to test innovative approaches (e.g., including in-situ treatment options) that are beyond those discussed here, which may also effectively reduce risk from contaminated sediment.

Consideration of materials deposited in floodplains, whether called soil or sediment, is an important factor in reducing risk in aquatic environments. Much of the general approach recommended in this guidance can be applied to contaminated floodplains, although the technical considerations are written with aquatic sediment in mind. Control of upland soils and other upland source materials is also critical to reducing risk in aquatic environments, but in general, existing guidance should be used for these materials [e.g., the U.S. Environmental Protection Agency's (EPA's) *Soil Screening Guidance: Users Guide* (U.S. EPA 1996a)]. However, where floodplain soils may be a source of contamination to surface water or sediment, the fate and transport of contaminants in the soil should be evaluated.

The emphasis of this guidance is on evaluating alternatives (e.g., the feasibility study stage of the Superfund process) and remedy selection, although the guidance presents some of the key remedial investigation issues at sediment sites. Following this introductory chapter, the guidance provides sediment-specific issues to consider during remedial investigations (see Chapter 2) and feasibility studies (see Chapter 3), followed by chapters concerning the three potential remedy approaches for sediment management (see Chapter 4, Monitored Natural Recovery; Chapter 5, In-Situ Capping; and Chapter 6, Dredging and Excavation). This guidance then presents information on selecting sediment remedies (see Chapter 7); and on monitoring sediment sites (see Chapter 8).

1.2 CONTAMINATED SEDIMENT

For the purposes of this guidance, contaminated sediment is soil, sand, organic matter, or other minerals that accumulate on the bottom of a water body and contain toxic or hazardous materials at levels that may adversely affect human health or the environment (U.S. EPA 1998a). Contaminants adsorbed to soil or in other forms may wash from land, be deposited from air, erode from aquatic banks or beds, or form from the underwater breakdown or buildup of minerals (U.S. EPA 1998a). Contaminated sediment may be present in wetlands, streams, rivers, lakes, reservoirs, harbors, along ocean margins, or in other water bodies. In this guidance, "water body" generally includes all of these environments. Some contaminants have both anthropogenic (or man-made) sources and natural sources (e.g., many metals and some organic compounds). This guidance addresses management of contaminants present above naturally occurring levels that may cause an unacceptable risk to humans or to ecological receptors.

Examples of primary and secondary sources of contaminants in sediment are included in Highlight 1-1.

Highlight 1-1: Potential Sources of Contaminants in Sediment

- Direct pipeline or outfall discharges into a water body from industrial facilities, waste water treatment plants, storm water discharges, or combined sewer overflows
- Chemical spills into a water body
- Surface runoff or erosion of soil from floodplains and other contaminated sources on land, such as waste dumps, chemical storage facilities, mines and mine waste piles, and agricultural or urban areas
- Air emissions from power plants, incinerators, pesticide applications, or other sources that may be transferred to a water body through precipitation or direct deposition
- Upwelling or seepage of contaminated ground water or non-aqueous phase liquids (NAPL) into a water body
- Direct disposal from docked and dry-docked ships, or release of contaminants from in-water structures and over-water structures or ship maintenance facilities

Organic contaminants in sediment typically adsorb to fine sediment particles and exist in the pore water between sediment particles. Metals also adsorb to sediment and may bind to sulfides in the sediment. The relative proportion of contaminants between sediment and pore water depends on the type of contaminant and the physical and chemical properties of the sediment and water. Pore water in sediment generally is interconnected with both surface water and ground water, although the degree of

interconnection may change from place-to-place and with flow changes in ground water and surface water.

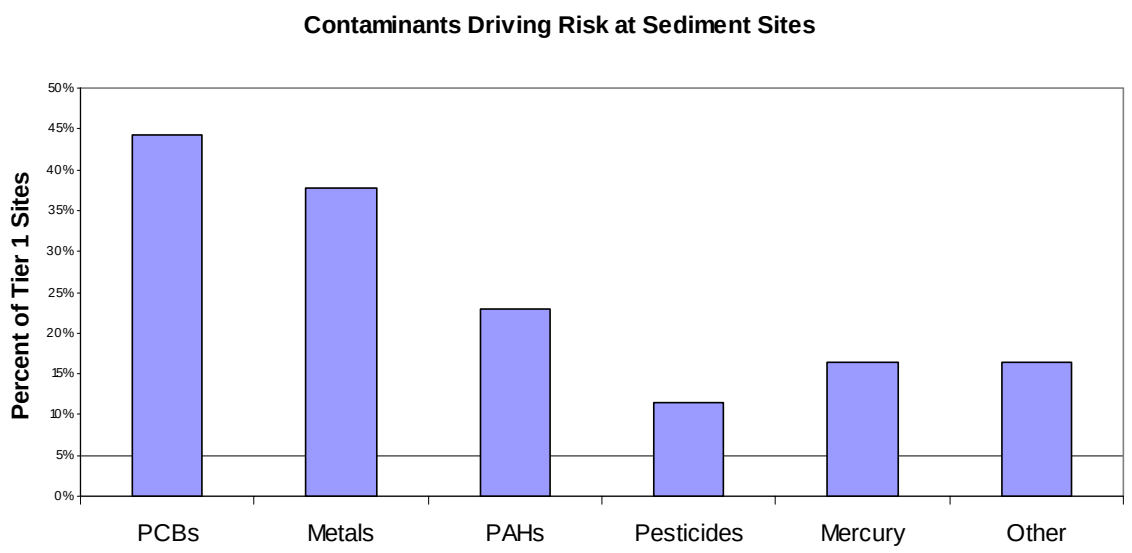
Many contaminants persist for years or decades because the contaminant does not degrade or degrades very slowly in the aquatic environment. Contaminants sorbed to sediment normally develop an equilibrium with the dissolved fraction in the pore water and in the overlying surface water to be taken up by fish and other aquatic organisms. Some bottom-dwelling organisms ingest contaminated sediment, and in shallow water environments, humans may also come into direct contact with contaminated sediment. Some contaminants, such as most metals, are hazardous primarily because of direct toxicity. Although some metals do accumulate in biota (i.e., bioaccumulate), generally they do not significantly increase in concentration as they are passed up the food chain (i.e., biomagnify). Others, called persistent bioaccumulative toxics (PBTs) [e.g., polychlorinated biphenyls (PCBs), pesticides, and methyl mercury] are of concern primarily because they may both bioaccumulate and biomagnify. Concentrations of PBTs in fish may endanger humans and wildlife that eat fish. Women of childbearing age, young children, people who derive much of their diet from fish and shellfish, and people with impaired immune systems may be especially at risk.

In 2004, the EPA released *The Updated Report on the Incidence and Severity of Sediment Contamination in Surface Waters of the United States* (U.S. EPA 2004a). This report identifies locations in all regions of the country where sediment contamination could be associated with probable or possible adverse effects to aquatic life and/or human health. In 2004, state and local authorities issued 3,221 advisories limiting fish consumption, which cover 35 percent of the nation's total lake acreage (excluding the Great Lakes), 24 percent of the nation's total river miles, and 100 percent of the Great Lakes and connecting waters, in part due to sediment contamination (U.S. EPA 2005a). In addition, contaminated sediment can significantly impair the navigational and recreational uses of rivers and harbors in the U.S. Navigational dredging is not currently being performed in many harbors and waterways because of the concern for impacts of dredging on water quality, liability to those performing the dredging, and disposal options for the contaminated dredged material [National Research Council (NRC 1997 and 2001)].

As of 2004, the Superfund program had decided to take an action to address sediment at approximately 140 sites, including federal facilities. The remedies for more than 60 sites, called "Tier 1" sites, are large enough that they are being tracked at the national level [for more information view the Office of Superfund Remediation and Technology Innovation's (OSRTI's) Contaminated Sediments in Superfund Web site at http://www.epa.gov/superfund/resources/sediment/sites.htm]. These sites include a wide variety of contaminants, as presented in Highlight 1-2.

Many aspects of the cleanup process may be more complex at sediment sites versus sites with soil or ground water contamination alone. Some potentially complicating factors for addressing contaminated sediment sites are listed in Highlight 1-3. Based on these factors and other reasons as presented in this guidance, a team of experts is frequently needed to advise the project manager (see Section 1.4.2 Technical Team Approach).

Highlight 1-2: Major Contaminants at Superfund Sediment Sites (Sites with Remedies Selected through 2004)



Highlight 1-3: Why Sediment Sites Are a Unique Challenge

- Sediment sites may have a large number of sources, some of which can be ongoing and difficult to control
- The sediment environment is usually dynamic, and understanding the effect of natural forces and man-made (anthropogenic) events on sediment movement and stability as well as contaminant transport can be difficult
- Cleanup work in an aquatic environment is frequently difficult from an engineering perspective and may be more costly than other media
- Contamination is often diffuse and the sites are often large and diverse (e.g., mixed use, numerous property owners)
- Many sediment sites contain ecologically valuable resources or legislatively protected species or habitats
- For large sites, a number of communities with differing views and opinions may be affected
- There may be significant injuries to trustee resources at sediment sites

1.3 RISK MANAGEMENT PRINCIPLES AND REMEDIAL APPROACHES

Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-08, *Principles for Managing Contaminated Sediment Risks at Hazardous Waste Sites* (U.S. EPA 2002a; attached as Appendix A to this document), presents eleven risk management principles that help project managers make scientifically sound and nationally consistent risk management decisions at contaminated sediment sites. Project managers should carefully consider these principles when planning and conducting site investigations, involving the affected parties, and selecting and implementing a response.

The eleven risk management principles should be applied within the framework of the EPA's existing statutory and regulatory requirements, such as the National Oil and Hazardous Substances Pollution Contingency Plan's (NCP's) nine remedy selection criteria (Title 40 Code of Federal Regulations (40 CFR) §300.430(c)). The eleven principles are listed in Highlight 1-4 and are incorporated throughout this guidance. The project manager should refer to OSWER Directive 9285.6-11, *OSRTI Sediment Team and the NRRB [National Remedy Review Board] Coordination at Large Sediment Sites* (U.S. EPA 2004b) to help ensure that the eleven principles are appropriately considered before making site-specific risk management decisions. Copies of both directives can be found on EPA's Superfund Web site at http://www.epa.gov/superfund/resources/sediment/documents.htm.

Highlight 1-4: Risk Management Principles Recommended for Contaminated Sediment Sites

1.	Control sources early
2.	Involve the community early and often
3.	Coordinate with states, local governments, Indian tribes, and natural resource trustees
4.	Develop and refine a conceptual site model that considers sediment stability
5.	Use an iterative approach in a risk-based framework
6.	Carefully evaluate the assumptions and uncertainties associated with site characterization data and site models
7.	Select site-specific, project-specific, and sediment-specific risk management approaches that will achieve risk-based goals
8.	Ensure that sediment cleanup levels are clearly tied to risk management goals
9.	Maximize the effectiveness of institutional controls and recognize their limitations
10.	Design remedies to minimize short-term risks while achieving long-term protection
11.	Monitor during and after sediment remediation to assess and document remedy effectiveness

Source: U.S. EPA 2002a; see Appendix A

1.3.1 Remedial Approaches

Highlight 1-5 lists the major remedial approaches or alternatives available for managing risks from contaminated sediment. Frequently, a final sediment remedy combines more than one type of approach.

Highlight 1-5: Remedial Approaches for Contaminated Sediment

In-situ Approaches	Ex-situ Approaches
In-situ Capping: • Single-layer granular caps • Multi-layer granular caps • Combination granular/geotextile caps Monitored Natural Recovery: • Physical isolation or other processes • Chemical transformation/sequestration • Biological transformation/sequestration Hybrid Approaches: • Thin layer placement of sand or other material to enhance recovery via natural deposition Institutional Controls: • Fish consumption advisories • Commercial fishing bans • Waterway or land use restrictions (e.g., no anchor or no wake zones, limitations on navigational dredging) • Dam or other structure maintenance agreements In-situ Treatment: • Reactive caps • Additives/enhanced biodegradation	Dredging: • Hydraulic, mechanical, or combination/hybrid dredging and transport to shore • Treatment of dredged sediment and/or removed water • Disposal of dredged sediment or treatment residuals in upland landfill, confined disposal facility, or other placement • Backfill of dredged area, as needed or appropriate Excavation: • Water diversion or dewatering • Excavation of sediment and transport to staging or processing • Treatment of excavated sediment • Disposal of excavated sediment or treatment residuals in upland landfill, confined disposal facility, or other placement • Backfill of excavated area, as needed or appropriate

1.3.2 Urban Revitalization and Reuse

Revitalizing urban areas and returning land and water bodies to productive uses have become increasingly important to the EPA's hazardous waste programs in recent years. Sediment sites may present opportunities to incorporate these concepts into remedy selection, remedial design, and into other phases of the risk management process. At sediment sites in urban areas, project managers should consider the goals of local governments and other entities to revitalize the use of waterfront property, harbors, and water bodies. This may involve reviewing local land use plans and identifying potential partners such as land owners, elected officials, and local land and water planning and development agencies. It may lead to opportunities to consider remedies that take into account the views of local stakeholders, land owners, and land use planners. For example, it may be possible to locate disposal structures or rail lines in areas that maximize future reuse. Beneficial reuse of dredged material may also present an opportunity for urban revitalization. Project managers are encouraged to make use of a collaborative Web site on beneficial reuse co-sponsored by the U.S. Army Corps of Engineers' (USACE) Engineer Research and Development Center and EPA's Office of Wetlands, Oceans, & Watersheds, available at http://el.erdc.usace.army.mil/dots/budm/budm.html.

1.4 DECISION-MAKING PROCESS

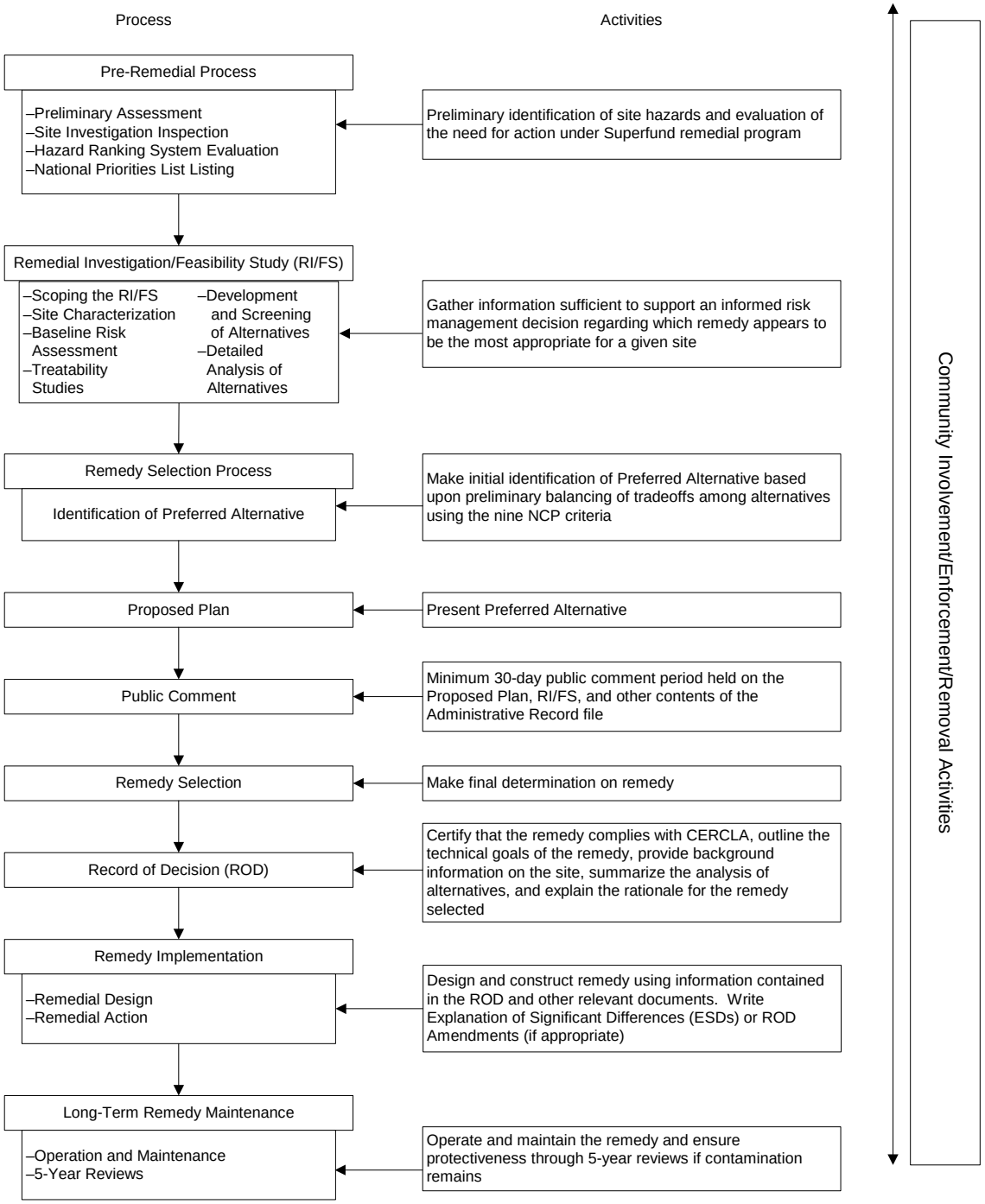
Decision making at sediment sites can follow somewhat different processes depending on the legal authority under which the sediment cleanup is conducted, the entity conducting the cleanup, and the scope of the problem. While meeting all legal and regulatory requirements, it is the intent of the Agency to allow project managers the flexibility needed to make the most appropriate recommendation for their site.

1.4.1 Decision Process Framework

Remedial actions taken under CERCLA generally follow the Superfund remedial response process shown in Highlight 1-6, taken from *A Guide to Preparing Superfund Proposed Plans, Records of Decision, and Other Remedy Selection Decision Documents* (U.S. EPA 1999a, also referred to as the "ROD Guidance"). Project managers should refer to the ROD Guidance for descriptions of each stage of the remedial process. Corrective actions under RCRA generally follow the RCRA remedial process laid out in the May 1, 1996 Advanced Notice of Proposed Rulemaking [(ANPR), 61 *Federal Register* (*FR*) 19447].

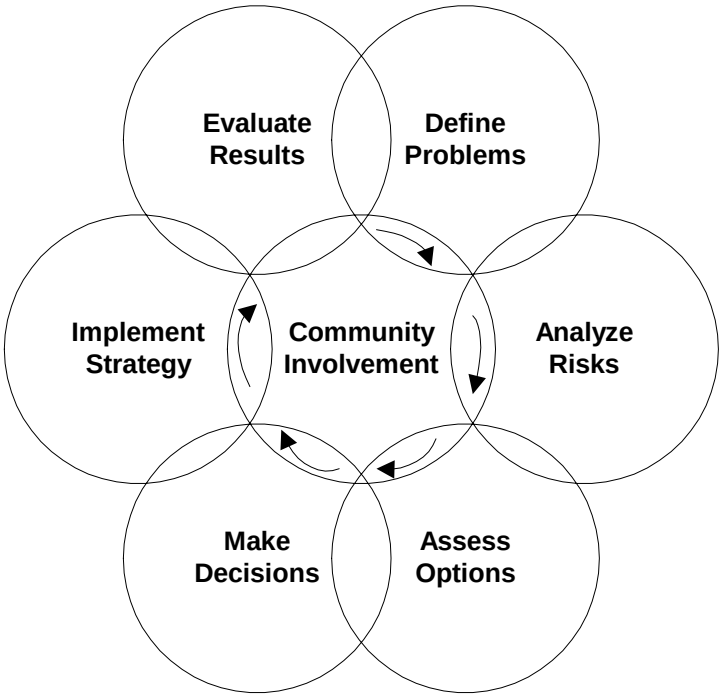
In the report, *A Risk-Management Strategy for PCB-Contaminated Sediments* (NRC 2001), the NRC recommended the use of the iterative decision-making approach, adapted from the 1997 Presidential/Congressional Commission on Risk Assessment and Risk Management (PCCRARM) risk management framework (Highlight 1-7). EPA project managers should consider using this approach within the context of EPA's existing remedial process. The NRC approach emphasizes the unique importance of community involvement throughout the decision-making process and the usefulness of iteration and adaptation if new information becomes available that changes the nature or understanding of the problem.

Highlight 1-6: General Overview of the Superfund Remedial Response Process



Adapted from: U.S. EPA 1999a

Highlight 1-7: National Research Council - Recommended Framework for Risk Management



Source: NRC 2001

1.4.2 Technical Team Approach

At many sediment sites, like other complex sites, a technical team approach frequently works best for effective site management. This team may be made up of lead and support regulatory agency technical personnel and experts from within and outside of the agencies, including those representing responsible parties. Typically, it is most effective to form this group early in the site investigation process and maintain it with as much continuity as possible throughout the decision making and implementation of the project. Ongoing dialogue managed by the project manager among the technical team on all of the technical issues should help to ensure a productive, efficient site investigation and evaluation of remedial alternatives in which the tendency toward an adversarial environment is minimized. This approach may require a strong project manager who facilitates the meetings and makes tough and fair decisions at points of disagreement.

Technical teams, which include experts representing both government and responsible parties, can be especially effective when the following principles are considered:

- Use sound, high quality science as the basis for site-specific decisions to
  - jointly identify information needs and project objectives;
  - call upon appropriate expertise;
  - recognize and understand uncertainty; and
  - operate in an atmosphere of respect.

- Communicate openly and frequently to
  - foster partnerships with all stakeholders and listen to all viewpoints;
  - jointly identify areas of disagreement and means to resolve them; and
  - openly discuss site goals and capabilities of available alternatives.

- Think outside the box to
  - look for common ground and shared goals;
  - solicit help of an outside neutral party when needed;
  - experiment with a change in structure when needed; and
  - look for opportunities to make progress.

1.4.3 Technical Support

In 2004, EPA established the Superfund Sediment Resource Center (SSRC) to make expert technical assistance available to EPA project managers of any Superfund sediment site. The SSRC has the capability of accessing expertise from the EPA's Office of Research and Development, the USACE, as well as private consultants and academic researchers. Information on how to access the SSRC is available through OSRTI's Contaminated Sediments in Superfund Web site at http://www.epa.gov/superfund/resources/sediment/ssrc.htm.

In 2002, EPA established the Contaminated Sediments Technical Advisory Group (CSTAG) to monitor the progress of, and provide advice regarding, a number of large, complex, or controversial contaminated sediment Superfund sites. For most sites, the group meets with the site team several times throughout the site investigation, response selection, and action implementation processes. Involving CSTAG at each major phase of a project provides additional technical support to the project team and ensures consistency with EPA's national sediment policies. General information about CSTAG and site-specific recommendations and responses are available through OSRTI's Contaminated Sediments in Superfund Web site at http://www.epa.gov/superfund/resources/sediment/cstag.htm.

1.5 STATE, TRIBAL, AND TRUSTEE INVOLVEMENT

State cleanup agencies and affected Indian tribes or nations at sediment sites or impacted downstream areas have an important role as co-regulators and/or affected parties and as sources of essential information at sediment sites. States are the lead agency at some sediment sites, or lead the cleanup of land-based source areas or particular operable units within a site. States and Indian tribes are frequently an indispensable source of historic and current information about water body uses, fish consumption patterns, ecological habitat, other sources of contamination within a watershed, and other information useful in characterizing the site and selecting an appropriate remedy. At some sediment sites, states are also owners of aquatic lands, dams, or floodplains. Where this is the case, states have multiple roles at the site. At sediment sites, as for all sites, states (and local and tribal governments where applicable) should be involved early and often in the remedial investigation/feasibility study (RI/FS). Coordination with the state may be especially helpful in the development of the conceptual site model, risk assessment, and remediation goals. Additional coordination during remedial design/remedial action phases is also very important (e.g., an opportunity to consult during the engineering design following remedy selection and on other technical matters related to implementation or monitoring of the remedy). Additional information on coordinating with states and Indian tribes can be found in OSWER Directive

9375.3-03P, *The Plan to Enhance the Role of States and Tribes in the Superfund Program* (U.S. EPA 1998b), and OSWER Directive 9375.3-06P, *Enhancing State and Tribal Role Directive* (U.S. EPA 2001a).

Where there is a potential for natural resource injuries and damages associated with sediment sites, coordination between the remedial and trusteeship roles at the federal, tribal, and state levels is especially important. Several different federal, state, or tribal natural resource trustees may have an interest in decisions concerning contaminated sediment sites and should have an opportunity to be involved throughout the investigation and remedy selection process at sites where they have jurisdiction and interest. The EPA is required to notify natural resource trustees promptly whenever a release of hazardous materials, contaminants, or pollutants may injure natural resources (CERCLA §104 (b)(2)). Trustees may include federal natural resource trustee agencies, such as the U.S. Department of the Interior (DOI), National Oceanic and Atmospheric Administration (NOAA), U.S. Department of Agriculture (USDA) Forest Service, U.S. Department of Defense (DoD), or U.S. Department of Energy (DOE). State agencies and federally recognized tribes may also be natural resource trustees. Where NOAA is the natural resource trustee, project managers should contact the Coastal Resource Coordinators (CRCs) who are assigned to each EPA region (except Regions 7 and 8, where there are no NOAA trust resources). These CRCs are also designated natural resource trustee representatives for marine resources, including migratory fish.

Interests and data needs of the trustees and the EPA may be similar. When trustees are involved, project managers should consult them early in the RI/FS process regarding potential contaminant migration pathways, ecological receptors, and characteristics of the water body and watershed. Sharing information early with federal, tribal, and state trustees (rather than bringing them in later in the process) often leads to more efficient data collection and better coordination of protection of human health and the environment. Information on coordinating with trustees is found in EPA's *ECO Update: The Role of Natural Resource Trustees in the Superfund Process* (U.S. EPA 1992a), in OSWER Directive 9200.4-22A, *CERCLA Coordination with Natural Resource Trustees* (U.S. EPA 1997a), and in OSWER Directive 9285.7-28P, *Ecological Risk Assessment and Risk Management Principles for Superfund Sites* (U.S. EPA 1999b).

1.6 COMMUNITY AND OTHER STAKEHOLDER INVOLVEMENT

Communication and outreach with the community and other stakeholders can pose unique challenges at sediment sites, especially at large sites on publicly used water bodies. Community involvement coordinators often have a critical role as part of the project team at these sites. Sediment sites that span large areas may present barriers to communicating effectively with different communities, local governments, and the private sector along the water body. People who live, work, and play adjacent to water bodies that contain contaminated sediment should receive accurate information about the safety of their activities, and be provided opportunities for involvement in the EPA's decision-making process for sediment cleanup. Community members may have a wide variety of needs and wishes for current and future uses of the water body. Highlights 1-8 and 1-9 list some of the common community concerns about contaminated sediment and risk reduction methods for sediment. These lists are compiled from information provided by Superfund project managers and by the NRC (2001). Project managers should be aware of these potential concerns and others specific to their sites.

Highlight 1-8: Common Community Concerns about Contaminated Sediment

- Human health impacts from eating fish/shellfish, wading, and swimming
- Ecological impacts on wildlife and aquatic species
- Loss of recreational and subsistence fishing opportunities
- Loss of recreational swimming and boating opportunities
- Loss of traditional cultural practices by Indian tribes and others
- Economic effects of loss of fisheries
- Economic effects on development, reduction in property values, or property transferability
- Economic effects on tourism
- Concern whether all contamination sources have been identified
- Increased costs of drinking water treatment, other effects on drinking water, and other water uses
- Loss or increased cost of commercial navigation

Highlight 1-9: Common Community Concerns about Sediment Cleanup

Concerns about MNR	Concerns about In-Situ Capping	Concerns about Dredging and Excavation
• Long time-frame for recovery	• Increased truck or rail traffic	• Increased truck or rail traffic
• Ongoing human and ecological exposure during recovery period	• Loss of resource/harvesting opportunities	• Noise, emissions, and lights at treatment and disposal facilities
• Doubts about effectiveness/spreading of contamination due to flooding/other disturbance	• Increased flooding	• Siting of new disposal facilities
• Extended loss of resources and uses	• Disturbance of aquatic habitat	• Loss of capacity at existing disposal facilities
• Perception of “do nothing” remedy	• Cap material source issues	• Loss of privacy during construction
• Property value/ transferability concerns with leaving significant contamination in place	• Loss of boat anchoring access	• Infrastructure needs on adjacent land
	• Doubts about effectiveness due to cap erosion, disruption, or contaminant migration through cap	• Recreation and tourism impacts
	• Loss of privacy during construction	• Access to private property
	• Recreation and tourism impacts during construction	• Property values near dredging, treatment and disposal facilities
	• Property value/transferability concerns with leaving significant contamination in place	• Disturbance of aquatic habitat
		• Resuspension/spreading contamination during dredging

Existing community involvement and sediment guidance from EPA and the NRC offer some guidelines for involving the community in meeting these and other concerns, as identified in Highlight 1-10.

Highlight 1-10: Community Involvement Guidance and Advice

EPA Office of Solid Waste and Emergency Response on Community Involvement (most available at http://www.epa.gov/superfund/action/community/index.htm):

- *Contaminated Sediments: Impacts and Solutions Video and Presenters Manual* (U.S. EPA 2005b)
- *Early and Meaningful Community Involvement* (U.S. EPA 2001b)
- *Superfund Community Involvement Toolkit* (U.S. EPA 2003a)
- *Community Advisory Group Toolkit for EPA Staff* (U.S. EPA 1997b)
- *The Model Plan for Public Participation*, National Environmental Justice Advisory Council (U.S. EPA 1996b)
- *Incorporating Citizen Concerns into Superfund Decision Making* (U.S. EPA 2001c)

RCRA Community Involvement Guidance (available at http://www.epa.gov/epaoswer/hazwaste/ca/guidance.htm; see list under "Public Involvement/Communication"):

- *RCRA Public Participation Manual*
- *RCRA Expanded Public Participation Rule* (60 *FR* 63417-34)
- *RCRA Corrective Action Workshop Communication Tools*

Office of Water on Communication of Fish Consumption Risks and Surveys (available at http://www.epa.gov/ost/fish):

- *Guidance for Conducting Fish and Wildlife Consumption Surveys* (U.S. EPA 1998c)
- *National Risk Communication Conference Held in Conjunction with the Annual National Forum on Contaminants in Fish* (May 6-8, 2001, conference proceedings available at http://www.epa.gov/waterscience/fish/proceedings.html)

National Research Council:

- *A Risk-Management Strategy for PCB-Contaminated Sediments, Chapter 4, Community Involvement* (NRC 2001)

Considering existing EPA guidance, and advice from the NRC and others, the three points below highlight some of the most critical aspects of community involvement at sediment sites.

Point 1. Involve the Community and Other Stakeholders Early and Often

In addition to the provisions addressing stakeholder involvement in CERCLA §117 and the NCP, one of EPA's eleven principles for managing risk of contaminated sediment is to involve the community early and often. This is an important principle in relation to other stakeholders as well, including local

governments, port authorities, and PRPs. The mission of the Superfund and RCRA community involvement programs is to advocate and strengthen early and meaningful community participation during Superfund cleanups. Planning for community involvement at contaminated sediment sites should begin as early as the site discovery and site assessment phase and continue throughout the entire Superfund process. As noted by the NRC (2001), community involvement will be more effective and more satisfactory to the community if the community is able to participate in or directly contribute to the decision-making process. Passive feedback about decisions already made by others is not what is referred to as community or stakeholder involvement. Early involvement allows necessary input from communities and other stakeholders and facilitates more comprehensive identification of issues and concerns early in the site management process.

Early community involvement enables EPA to learn what stakeholders, especially community members, think are important exposure pathways of the contamination and of potential response options. Available materials about community involvement in the risk assessment process include *A Community Guide to Superfund Risk Assessment – What's it All about and How Can You Help?* (U.S. EPA 1999c). Although the regulators have the responsibility to make the final cleanup decision at CERCLA and RCRA sites, early and frequent community involvement helps the regulators understand differing views and allows the regulators to factor these views into their decisions.

Point 2. Build an Effective Working Relationship with the Community and Other Stakeholders

In addition to the provisions addressing public outreach in CERCLA §117 and the NCP, building partnerships with key community groups, the private sector, and other interested parties is critical to implementing a successful outreach program. Involving communities by fostering and maintaining relationships can lead to better site decisions and faster cleanups. Referring specifically to PCB-contaminated sites, but with application to all sediment sites, the NRC (2001) report recommended that community involvement at PCB-contaminated sediment sites should include representatives of all those who are potentially at risk due to contamination, although special attention should be given to those most at risk.

Participants at EPA's 2001 *Forum on Managing Contaminated Sediments at Hazardous Waste Sites* (U.S. EPA 2001d) offered the following ideas, among others, for building effective working relationships with communities and other stakeholders at sediment sites:

- Create realistic expectations up front for both public involvement and sediment cleanup;
- Where possible, instead of asking for extra meetings, ask for time at existing community meetings;
- Use store-front on-site offices for public information when possible;
- Be aware of tribal cultural and historic sites, not all of which are registered or are on tribal land;
- Minimize jargon when speaking and writing for the public;
- Use independent facilitators for public meetings when needed;

- Include broad representation of the community;
- Look for areas where you can act on input from the community; and
- Encourage continuity of membership as much as possible.

A complete list of forum presentation materials is available through EPA's Superfund Web site at http://www.epa.gov/superfund/resources/sediment/meetings.htm.

Point 3. Provide the Community with the Resources They Need to Participate Effectively in the Decision-Making Process

In addition to the provisions addressing public outreach in CERCLA §117 and the NCP, project managers should ensure that community members have access to the tools and information they need to participate throughout the cleanup process. Educational materials should be accessible, culturally sensitive, relevant, timely, and translated when necessary. One potential resource is a video prepared by EPA's Superfund office, which explains to communities the general remedial options for sediment (U.S. EPA 2005b).

Contaminated sediment sites often involve difficult technical issues. It is especially important to give community members opportunities to gain the technical knowledge necessary to become informed participants. Project managers should provide technical information to communities in formats that are accessible and understandable. The EPA has a number of resources available to help make large volumes of complex data more easily understandable. These resources are often valuable communication tools not only with the community, but also within the EPA and between cooperating agencies. An example includes the graphics and scenario analysis capabilities of Region 5 Fully Integrated Environmental Location Decision Support (FIELDS). FIELDS began as an effort to solve contaminated sediment problems more effectively in and around the Great Lakes and is applied in other regions as well. Information about FIELDS is available at http://www.epa.gov/region5fields.

Information about Superfund community services is available through EPA's Superfund Web site at http://www.epa.gov/superfund/action/community/index.htm. This Web site provides information on community advisory groups (CAGs), EPA's Technical Assistance Grant (TAG) program, and the Technical Outreach Services for Communities (TOSC) program. The TOSC program uses university educational and technical resources to help community groups understand the technical issues involving hazardous waste sites in their communities. The Superfund statute provides for only one TAG per site. At very large sites with diverse community interests, communities may choose to form a coalition and apply for grant funding as one entity. The coalition would need to function as a nonprofit corporation for the purpose of participating in decision making at the site. Individual organizations may choose to appoint representatives to a steering committee that decides how TAG funds should be allocated, and defines the statement of work for the grant. The coalition group may hire a grant administrator to process reimbursement requests to the EPA and to ensure consistent management of the grant. In some cases, EPA regional office award officials may waive a group's $50,000 limit if site characteristics indicate additional funds are necessary due to the nature or volume of site-related information.

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